

MODEL
MS-1



MS-1

MICROSENSOR™ MINIATURE INFRARED SENSOR



INSTALLATION & OPERATION GUIDE

MS-1

MicroSensor™
Miniature
IR Sensor

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Introduction

The MS-1 is a miniature IR sensor designed for use with the Niles Infrared Repeating systems.

Installed in a remote room location, the MS-1 receives the IR commands transmitted from your existing hand-held remotes in that room. The commands are carried via a small 2-conductor shielded cable to your A/V equipment in another room, and instantly "repeated".

The MS-1 is compatible with all current Niles infrared systems. It may be used along with, or as an alternative to, the Niles IRR4D+, IRR4S+, SCW-UIR, MS-2, TIR1+ and MS360 IR sensors.

The MS-1 is just one part of the three building blocks necessary to complete a Niles IR repeating system:

- Main System Unit—IntelliControl™, RVL-6, IRP2+, IRP6+, IRZ6+.
- IR Sensors—Models IRR4D+, IRR4S+, SCW-UIR, TIR1+, MS-1, MS-2 and CMS-3.
- IR Flashers—Models IRC-1 and IRC-2.

An expansion unit, Model XRP6+, is available for IR repeater systems requiring control in more than six rooms.

Features and Benefits

The MS-1 offers a number of improvements over other miniature IR sensors.

- Small size of only 1/2" diameter by 2-5/16" long—fits almost anywhere.
- Universal system—compatible with virtually all brands of A/V equipment and remote controls.
- Excellent IR receiving range—you get 18 to 30 feet of remote control range (depending upon the strength of your handheld remote).
- 100% factory tested for pickup range and angle.
- Green "flash-back" L.E.D. visually confirms remote control operation.
- Simple 3-wire hookup—10 feet of IR cable included.
- Printed circuit board design uses surface mount technology (SMT), assuring high reliability.
- Ideal for both home and commercial installations.
- Bezel colors: Each MS-1 includes a black and white bezel.
- Two year parts and labor warranty.
- Proudly made in the USA.

IMPORTANT

Refer installation to a professional custom installer if you are unfamiliar with any of the following procedures.

Installation Considerations

Type of Cable

The MS-1 connects to the Niles Infrared Systems with an individual home run of 2-conductor shielded cable. Recommended cables are Niles data grade IR cable, West Penn D291, Belden 8761, Carol C2516 or equivalent, made of two 22 gauge (or larger) conductors surrounded by a foil shield and a bare drain (ground) wire.

DO NOT USE UNSHIELDED CABLE WITH THE MS-1.

MS-1 Mounting Location

The MS-1 is ideal for use in applications when tabletop, ceiling, or wall-mounting is undesirable. Its small size and unobtrusive appearance makes it ideal for installation in obscure, hidden locations, in cabinet facings, or in the “sensor knock-out built into Niles in-wall loudspeakers. Installing the MS-1 close to the primary location of the user will ensure best performance.

The MS-1 is designed to flush-mount almost anywhere. Convenient mounting locations for the MS-1 are:

- In a cabinet door
- In a wall, or wall-plate
- Behind a speaker grille*

* Some types of speaker grilles will reduce the IR pickup range of the MS-1. If unsure, test the pickup range before permanently installing the MS-1 behind the speaker grille.

TOOLS REQUIRED

- 1/8" Standard Slotted Screwdriver
- Adjustable wrench or pliers
- Wire Stripper

Receiving Range and Pickup Angle

The receiving range of the MS-1 will vary according to the IR output strength of the remote control being used. Remote strength varies among brands depending on the number and size of batteries used, and how many IR emitters the remote has. For example, remotes that operate on two small AAA batteries and have only one IR emitter are generally not as strong as remotes that use the larger AA size batteries and have two emitters. Tests with various manufacturers' remote controls have shown that the operating range can vary from a minimum of 18 feet to a maximum of about 30 feet.

Infrared signals travel essentially line-of-sight. They will not pass through or around solid objects. Do not rely on an IR signal being able to "bounce" off a wall or object to the MS-1.

The IR pickup angle of the MS-1 is 60° off-axis (horizontal and vertical) at 18 feet. For more information see **(Figure 3)** *MS-1 Operating Range* on Page 11.

Avoiding Optical Interference

As with any type of IR sensor, avoid locating the MS-1 where it will be exposed to direct sunlight. The sun emits an enormous amount of IR energy, many times stronger than that of a hand-held remote. Keep in mind that the less sunlight the MS-1 receives, the better the range of the remotes.

DO NOT mount the MS-1 outdoors. During daylight hours, you will experience poor range and/or interference.

Avoiding Electrical Interference

Avoid locating the MS-1 near any potential sources of electrical or optical noise, such as light dimmers, fluorescent lighting fixtures, low-voltage lights, and neon lights.

If you are installing the MS-1 near a television, keep it at least 6" away from the top, bottom or sides of the TV to avoid interference. Avoid running the MS-1's cable on the top of the TV, or near the back cabinet of the TV. This will help reduce the possibility of interference.

DO NOT INSTALL THE MS-1 INTO ELECTRICAL BOXES WITH 110 VOLT DEVICES.

"TECH TIP"

Do not install the MS-1 next to a light dimmer, or where it will be exposed to direct sunlight.

Some states or municipalities allow devices such as the MS-1 to be installed into the same electrical box as 110 volt devices, provided a "low-voltage partition" is used between the devices. We do not recommend this. The cable connected to the MS-1 can act as an "antenna" for electrical noise. Locating the MS-1 cable too close to a light dimmer or switch may interfere with the MS-1. If you must locate the MS-1 near electrical devices, install it in a separate metal electrical box, ground the box to the electrical system ground, and route the MS-1 cable several feet away from all electrical wiring.

Avoiding Optical Feedback

If installing the MS-1 in the same room as an IR flasher, it is possible for the flasher's IR output to be picked-up by the MS-1. This effect, known as an optical feedback loop, can cause erratic operation. Optical feedback is similar to acoustical feedback: the howling or whistling sound heard in a P.A. system when the microphone is too close to the speaker. To avoid optical feedback:

1. Lower the output power of the flasher(s) using the variable flasher level control(s) on the Niles Main System Units.
2. Re-position the flasher(s) and/or the sensor.
3. Use Niles IRC-2 flashers and cover them with the supplied IR blockers.

Changing the Color of the MS-1

The bezel surrounding the lens on the MS-1 is removable, allowing fast and easy color changes as needed. A black and white bezel are included with your MS-1. If you desire, you may paint the MS-1 bezel yourself—to blend it seamlessly into your decor.

If you need to change the color of the MS-1:

1. Hold the MS-1 as shown in **(Figure 1)** on next page. Unscrew the bezel by turning it counter-clockwise. Note that the MS-1's lens is held in place by the bezel—be careful not to lose it.

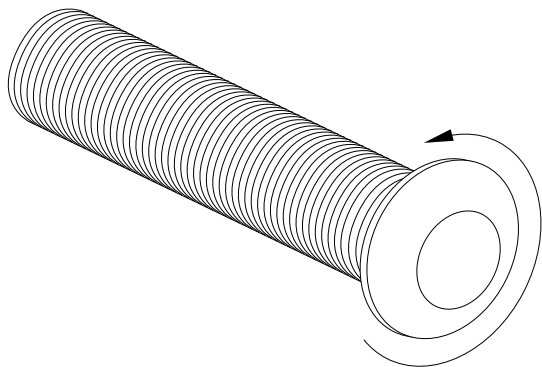
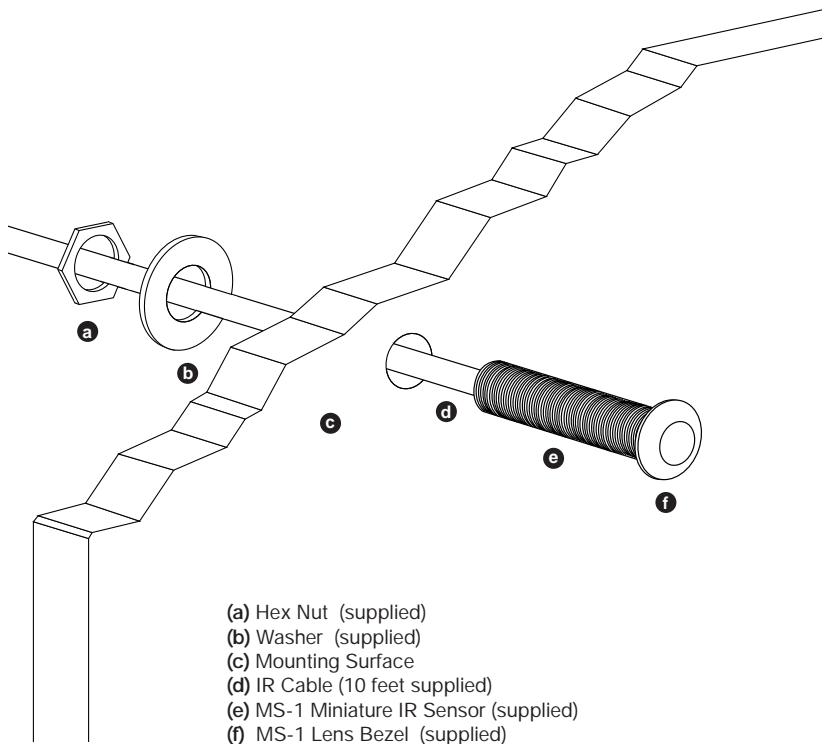


Figure 1
Removing the Bezel

2. Hold the MS-1 so that the front of it is facing you, making sure that the lens is in place. Screw the new bezel onto the MS-1 by turning it clockwise.

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Installation

If you are installing the MS-1 into an existing wall, take time to consider any possible obstructions which may be hidden inside the wall, such as wood and metal studs; electrical, telephone or other types of wiring; plumbing; conduit; old wall safes; etc.

1. Determine a mounting location for the MS-1. Select a location where you will have access to the rear of the MS-1 after it is installed. This will allow you to securely tighten the MS-1 to the mounting surface using the supplied hardware.
2. Drill a 1/2" hole where the MS-1 will be mounted.
3. Run the MS-1's IR cable. Label the cable for future reference. The MS-1 is supplied with 10' of pre-stripped IR cable. The IR cable may be shortened or lengthened as needed. If you want to make the MS-1's cable shorter, use a pair of wire cutters to cut the cable to the desired length. The IR cable may be lengthened by splicing it to a recommended IR cable (*See Installation Considerations—Type of Cable*). You may splice the MS-1 cable to another cable by soldering or crimping the connections.
4. Connect the MS-1 cable to the Main System Unit. Strip 1/4" of insulation from the end of each wire. Tightly twist the end of each wire until there are no frayed ends. Insert the end of each wire into the appropriate hole on the Main System Unit's connector block; secure the wiring to the connector by tightening the small connector screws. Double-check all connections. See (Figure 2).

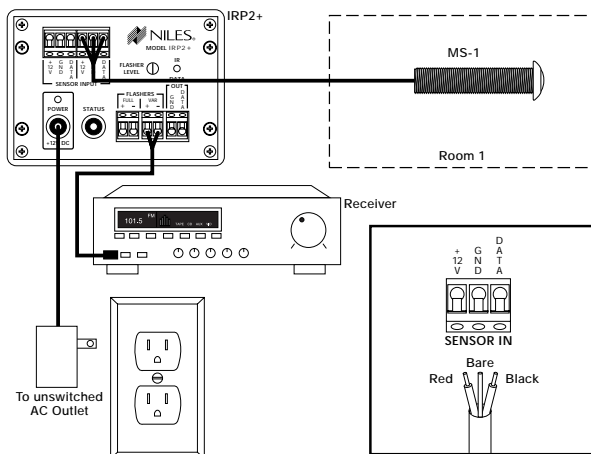


Figure 2
Wiring Diagram
(Installed in an
IRP2+ System)

MS-1 Wiring Configuration

- PIN 1 = Red (+12V DC)
- PIN 2 = Bare (GND)*
- PIN 3 = Black (DATA)

NOTE: The color code shown above is for West Penn D291 IR cable. Actual color code of recommended cables may vary.

5. Secure the MS-1 by tightening the hex nut. *DO NOT OVER-TIGHTEN.*

* You must use the bare drain wire for the ground connection.

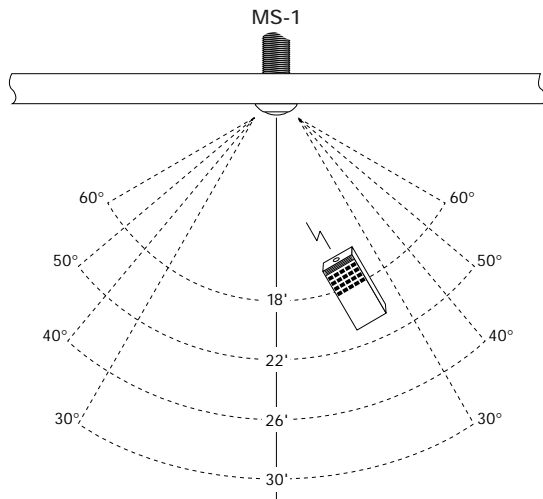
Operation

This manual contains instructions for the MS-1 only. For specific information on the adjustment and operation of your Niles Infrared system, please refer to the instruction manual included with your Niles Main System Unit.

Operation of the MS-1 is straightforward. Simply aim your hand-held remote at the MS-1. Your IR command is instantly repeated to your A/V equipment. A green "flash-back" LED on the MS-1 visually confirms the presence of an IR signal.

Figure 3
MS-1 Operating
Range

*All Angles
Referenced
to Center Axis.



Troubleshooting

The "flash-back" LED on the front of the MS-1 is a useful troubleshooting aid.

The LED should light only when a remote command is being received.

If the MS-1 does not work, and the LED does not light at all:

1. Test the remote control(s) by operating the A/V equipment directly. Replace the batteries if needed.
2. Double check the cable connections on all MS-1's and on the Main System Unit. Look for open, shorted or reversed wires.

If the MS-1 does not work, and the LED remains solidly lit:

1. Double check the cable connections on all MS-1's and on the Main System Unit. Look for shorted or reversed wires.
2. Test for interference from the following sources:
 - Sunlight in the area of the MS-1
 - Fluorescent, neon or halogen lights in the room
 - Light dimmers, beginning with those closest to the MS-1

Observe the MS-1's LED while performing all the tests. It is possible to have interference from more than one source.

There are many methods for reducing interference. Which solution is best for you depends on your situation. Contact Niles Technical Support at 1-800-289-4434 if you require further assistance.

If the LED on the MS-1 "flickers" dimly, and the MS-1 functions normally, there is no cause for concern.

Specifications

IR System

Compatible with virtually all brands of remotes using carrier frequencies between 18 and 100 kHz

IR Receiving Range

Varies depending on remote strength; 18-30 feet typical

IR Receiving Angle

60° off-axis (horizontal and vertical) at 18 feet

Mounting

Thru-hole, fits into a 1/2" diameter hole; requires a minimum of 2-5/16" mounting depth

Wiring Requirements

Individual home-runs of 2-conductor shielded cable, Niles IR Cable, West Penn D291 or equivalent

Unit Dimensions

Front Bezel: 3/4" diameter x 1/4" high

Overall Unit: 1/2" diameter x 2-1/2" long



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